Amendments to the Specification:

Page 1, after the title, insert—BACKGROUND OF THE INVENTION—

Please rewrite the entire text beginning on page 1, line 1 and ending on page 2, line 13 as follows:

—Elastomeric materials which ~~as a rule~~ are not thermoplastic ~~and therefore also~~ cannot be welded to thermoplastics. They have to date therefore generally been bonded by adhesive bonding. This is complicated, and owing to the use of solvents, environmentally undesired. Furthermore, some thermoplastics are poorly accessible to adhesive bonding, for example polyethylene.

It is known (EP-B-0751865, DE-A-3621030,EP-A-159169,EP-A-483569, US-A-5279693, FR-A-1506163, WO 89/10832) that two thermoplastic parts can be bonded by means of laser beams for which the upper of the two parts is transparent and which are absorbed in the region of the weld joint. As a result of the absorption in a thermoplastic material, the latter becomes molten and is therefore directly capable of effecting welding to the counter-surface. This is also true when one of the two parts consists of a thermoplastic elastomer (Hänsch et al., "Harte und weiche Kunststoffe mit Diodenlaser verbinden" [Bonding hard and soft plastics using diode lasers] in Kunststoffe [Plastics] 1988, pages 210-212. A precondition for a reliable cohesive bond is, however, that the polymers are miscible with one another, which is often problematic precisely when one of the two parts consists of an elastomer. Difficulties often also arise because the heat

draws away toward the back in the part absorbing the radiation and is therefore not available for welding, so that weld faults occur.

The invention is concerned especially with the bonding of a thermoplastic polymer layer to the surface of an elastomer. It is the object of the invention to provide a reliable bonding method which manages without an adhesive. ~~The achievement according to the invention consists in the features of claim 1 and preferably those of the subclaims.~~

SUMMARY OF THE INVENTION

Briefly stated, the invention in a preferred form is a method for bonding a layer of thermoplastic polymer to the surface of an elastomer, wherein the thermoplastic layer is pressed against the surface of the elastomer while the elastomer is heated by heat radiation to which the thermoplastic layer is transparent and the surface of the elastomer absorbs and which is introduced by irradiation through the thermoplastic layer. The method is characterized in that a foamed elastomer is used. The elastomer preferably has an open-pore surface. The heat radiation is preferably formed by laser light. The thermoconductivity of the elastomer is preferably less than 0.2 W/mK.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The method according to the invention differs from the known method last discussed in that a foamed elastomer is used. If the thermoplastic layer is pressed onto the surface to be bonded thereto, substantially only the surface of

the elastomer is heated by the heat radiation, in particular infrared radiation ~~is distinguished by the fact that the thermoplastic layer is pressed onto the surface to be bonded thereto while the latter is heated by heat radiation, in particular infrared radiation. This is introduced by irradiation through the thermoplastic layer, which is transparent to these waves, whereas it is absorbed by the surface of the elastomer. Substantially only the surface of the elastomer is heated thereby. The surface of the thermoplastic layer which is pressed against said elastomer is then also indirectly heated by heat conduction. It becomes molten and in this state bonds intimately with the surface of the elastomer~~.

~~It is known (EP-B-0751865, DE-A-3621030,EP-A-159169,EP-A-483569, US-A-5279693, FR-A-1506163, WO 89/10832) that two thermoplastic parts can be bonded by means of laser beams for which the upper of the two parts is transparent and which are absorbed in the region of the weld joint. As a result of the absorption in a thermoplastic material, the latter becomes molten and is therefore directly capable of effecting welding to the counter-surface. If, on the other hand, an elastomer is present instead of the heat-absorbing thermoplastic, heat is generated in the surface of the elastomeric material, which does not become liquid. From there, it flows mainly into the elastomer cross-section present behind the surface. Experience to date shows that a proper bond between a thermoplastic transparent to the radiation and an elastomer absorbing the radiation therefore cannot be achieved by the known method.~~

That a good bond is nevertheless established ~~according to the invention~~ is due to the peculiarity that the elastomer ~~is~~ has a low thermal conductivity as a

result of being foamed. ~~As a result of this, it has a low thermal conductivity~~, and the heat converted in its surface therefore cannot flow away rapidly toward the back. The surface of the elastomer can therefore be heated to such an extent that the surface of the thermoplastic layer which is pressed against it is sufficiently liquefied by heat conduction to be able to form an adequate bond to the surface of the elastomer. In order to achieve this effect, the thermal conductivity of the elastomer directly behind its surface (i.e. at a distance from the surface which is not greater than 0.5 mm, preferably not greater than 0.2 mm) is expediently less than 0.2 and more preferably less than 0.13 W/mK.—